# Yuan "Charles" Cui

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digital-flaneur.github.io

## Research Interests

**Broad Interests**—human–AI collaboration, data visualization, and data science.
**Ph.D. Thesis**—designing/developing/evaluating adaptive, scalable, and human-centered technology for data visualization and education (using large language models, data science, and qualitative methods).
**Other Interests**—building data science solutions for non-profits and governments to address social problems.

## Education

**Northwestern University** — Evanston, IL
*Ph.D., Computer Science* — 2020 - Present
*Advisor: Matthew Kay*
*Master's, Computer Science* — 2020 - 2023
*Advisor: Matthew Kay*

**Oberlin College** — Oberlin, OH
*B.A., Mathematics, Computer Science* — 2016 - 2020

**Budapest Semesters in Mathematics** — Budapest, Hungary
*Study Abroad* — 2019

## Publications

**AVEC: An Assessment of Visual Encoding Ability in Visualization Construction**
Lily W. Ge, Yuan Cui, Matthew Kay
*ACM Conference on Human Factors in Computing Systems* (CHI) 2025 | Acceptance Rate: 25%

**Promises and Pitfalls: Using Large Language Models to Generate Visualization Items**
Yuan Cui, Lily W. Ge, Yiren Ding, Lane Harrison, Fumeng Yang, Matthew Kay
*IEEE Visualization Conference* (VIS) 2024 | Acceptance Rate: 22%

**Odds and Insights: Decision Quality in Exploratory Data Analysis Under Uncertainty**
Abhraneel Sarma, Xiaoying Pu, Yuan Cui, Eli T Brown, Michael Correll, Matthew Kay
*ACM Conference on Human Factors in Computing Systems* (CHI) 2024 | Best Paper Honorable Mention (Top 5%)

**Adaptive Assessment of Visualization Literacy**
Yuan Cui, Lily W. Ge, Yiren Ding, Fumeng Yang, Lane Harrison, Matthew Kay
*IEEE Visualization Conference* (VIS) 2023 | Acceptance Rate: 25%

**CALVI: Critical Thinking Assessment for Literacy in Visualizations**
Lily W. Ge, Yuan Cui, Matthew Kay
*ACM Conference on Human Factors in Computing Systems* (CHI) 2023 | Best Paper Honorable Mention (Top 5%)

**Can an Algorithm be My Healthcare Proxy?**
Duncan McElfresh, Samuel Dooley, Yuan Cui, Kendra Griesman, Weiqin Wang, Tyler Will, Neil Sehgal, and John Dickerson
*Explainable AI in Healthcare and Medicine* 2021

## Manuscripts

**How High School Teachers Develop Tests and How AI Could Help**
Yuan Cui, Mia Cheng, Matthew Kay, Fumeng Yang. (*Under Review*)

**Quantifying the Uncertainty of Age-Specific Mortality Estimates in Data-Scarce Contexts**
Nathaniel Darling, Yuan Cui, Irena Chen, Ugofilippo Basellini, Monica Alexander.
*Population Association of America Annual Meeting Poster Presentation* (PAA) 2025

## Professional Experience

**University of Maryland | FIGX Lab** College Park, MD
*Visiting Ph.D. Researcher* 12/2024 - 06/2025
Developing interactive AI-powered systems for educational test development.

**Max Planck Institute for Demographic Research** Rostock, Germany
*Social Data Science Researcher* 06/2024 - 08/2024
Built statistical models to estimate age-specific mortality in a data-scarce context. Coauthored a paper, which was accepted to Population Association of America 2025 Annual Meeting.

**Stanford University | Regulation, Evaluation, and Governance Lab (REGLAB)** Stanford, CA
*Graduate Fellow* 06/2023 - 08/2023
Designed statistical sampling techniques to estimate racial disparity when data is scarce, and established performance guarantees with mathematical proofs. Built simulations and estimated health disparity in a dataset containing ~7M Americans' healthcare records.

**Carnegie Mellon University | Data Science for Social Good Foundation (DSSG)** Pittsburgh, PA
*Data Science Fellow* 05/2022 - 08/2022
Built a machine learning system to improve call routing of the 988 Lifeline which serves ~2M callers per year. Obtained results that suggested the new system could help ~20K additional callers per year.

**University of Chicago | Consortium on School Research** Hyde Park, IL
*Research Intern* 03/2022 - 05/2022
Built statistical models on Chicago Public Schools data to predict students' graduation rates.

**HomeRiser, Inc** Remote
*Co-founder, Head of Data Science* 01/2021 - 10/2021
Co-founded a real estate technology start-up to provide more flexible and affordable ways to finance people's home ownership. Developed a financial model in Python that simulated cash flow and generated a detailed profit and loss statement.

**University of Maryland | REU - Combinatorics and Algorithms for Real Problems** College Park, MD
*Undergraduate Researcher* 05/2019 - 08/2019
Developed a machine learning model for advance healthcare directives. Deployed active learning algorithms to dynamically select survey questions based on patients' previous responses. Built a website to collect data. Coauthored a paper, which was accepted to the *Explainable AI in Healthcare and Medicine*.

**Oberlin College | Computer Science Department** Oberlin, OH
*Undergraduate Researcher* 06/2018 - 08/2018
Analyzed a repeated pricing game between a buyer and a seller in the presence of privacy and the absence of commitment power. Conducted numerical experiments and solved for equilibrium in the game. Formalized results about the effect of privacy in our repeated sales setting.

## Presentations, Tutorials, Workshops

### Presentations

IEEE Visualization Conference (VIS). *"Promises and Pitfalls: Using Large Language Models to Generate Visualization Items."* Oct 2024, Tampa, FL.

Max Planck Institute for Demographic Research (MPIDR). *"A Fast and Furious Introduction to Computer Science."* Jul 2024, Rostock, Germany.

IEEE Visualization Conference (VIS). *"Adaptive Assessment of Visualization Literacy."* Oct 2023, Melbourne, Australia.

Data for Good Conference. *"Improving the 988 Suicide & Crisis Lifeline's Service Through Better Call Routing."* Sept 2022, Seattle, WA. Joint with Irene Tang.

### Tutorials

Max Planck Institute for Demographic Research (MPIDR). *"Building an Academic Website and Hosting on Github."* Jul 2024, Rostock, Germany.

ACM Conference on Fairness, Accountability, and Transparency (FACCT). *"Data Externalities."* Mar 2021, Remote. Joint with Rediet Abebe, Mihaela Curmei, Andreas Haupt, and Yixin Wang.

### Workshops

ACM Conference on Human Factors in Computing Systems (CHI). *"Toward a More Comprehensive Understanding of Visualization Literacy."* May 2024, Honolulu, HI. Joint with Lily W. Ge, Maryam Hedayati, Yiren Ding, Karen Bonilla, Alark Joshi, Alvitta Ottley, Benjamin Bach, Bum Chul Kwon, David N. Rapp, Evan Peck, Lace M. Padilla, Michael Correll, Michelle A. Borkin, Lane Harrison, Matthew Kay.

## Honors and Awards

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| Intersection Science Fellowship (Northwestern Institute on Complex Systems) | 2024 |
| Best Paper Honorable Mention for "Odds and Insights…" (CHI) | 2024 |
| Best Paper Honorable Mention for "CALVI…" (CHI) | 2023 |
| HCI + Design Cluster Fellowship (Northwestern University) | 2022 |
| Phi Beta Kappa (Oberlin College) | 2020 |
| Elbridge P. Vance Scholar of Mathematics (Oberlin College) | 2016 - 2020 |

## Professional Service

**Equity and Access in Algorithms, Mechanisms, and Optimization Bridges (EAAMO Bridges)**

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| Co-Director | 2022 - present |
| Co-Lead of the Data Economies Working Group | 2021 |
| Membership Manager | 2021 |

**Northwestern University**

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| Computer Science Ph.D. Advisory Council | 2025 - present |

**The Journal of Visualization and Interaction (JOVI)**
Open Practices Chair 2024 - present
Reviewer 2024 - present

**Conference Reviewer**
International Conference on Artificial Intelligence in Education (AIED) 2025
IEEE Visualization Conference (VIS) 2024
ACM Conference on Human Factors in Computing Systems (CHI) 2024

**Conference Volunteer**
ACM Symposium on Theory of Computing (STOC) 2021
ACM Conference on Economics and Computation (EC) 2020

## Selected Media

Making Meaningful Impact: Using Data Science for Social Good 2022
*Carnegie Mellon University Heinz College*
Applying Technical Knowledge for Social Good 2022
*Northwestern University Computer Science*
Nine International Obies Will Begin PhDs in STEM 2020
*Oberlin College and Conservatory*
Oberlin Shansi Announces Summer 2019 In-Asia Grant Recipients 2019
*Oberlin College and Conservatory*
Building Solidarity with Youth in Nepal 2017
*Oberlin College and Conservatory*

## Teaching Experience

**Northwestern University** Evanston, IL
Computer Science Department 2021-2024
TA: *Design & Analysis of Algorithms, Mathematical Foundations of Computer Science (2x)*

**Oberlin College** Oberlin, OH
Mathematics Department 2017-2020
TA: *Linear Algebra (2x), Discrete Mathematics (2x), Calculus II, Calculus I*
Economics Department 2019
TA: *Principles of Finance*
Computer Science Department 2017
TA: *Introduction to Computer Science*

## Mentoring (Research and Projects)

**Current Students**
Jovy Zhou (Northwestern UG)
Xiaolin Liu (Northwestern UG)

Eric Lee (Northwestern UG)
April Shi (Northwestern UG)
Joshua Yao (Northwestern UG)
Mia Cheng (Northwestern UG → Datadogs)

**Past Students**

Natalie Cheng (Northwestern UG)
Harry Guan (Northwestern UG)
Thushan Ranasinghe (University of Maryland UG)
Frank Yang (Northwestern UG → Scale AI)
Kevin Su (Northwestern UG → Palantir Technologies)
Zarif Ceaser (Northwestern UG → Northwestern Mutual)
Karthik Subramanian (Northwestern UG → Amazon Web Services)
Ryan Wong (Northwestern UG → Citadel)
Josh Lee (Northwestern UG → JPMorganChase)

## Technical Skills

**Programming Languages**
Python, R, TypeScript, JavaScript, PostgreSQL, Mathematica, LaTeX

**Frameworks**
Django, Next.js, React

**Organization**
Github, Notion, Trello

**Research Software and Skills**
Qualtrics, Prolific

## References

Matthew Kay | Assoc. Prof. of Computer Science and Communication Studies
Institution: Northwestern University Contact: mjskay@northwestern.edu

Fumeng Yang | Asst. Prof. of Computer Science
Institution: University of Maryland, College Park Contact: fmy@umd.edu

Lane Harrison | Assoc. Prof. of Computer Science
Institution: Worcester Polytechnic Institute Contact: ltharrison@wpi.edu

Rayid Ghani | Distinguished Career Prof. of Machine Learning and Public Policy
Institution: Carnegie Mellon University Contact: rayid@cmu.edu